

Appln. No. 09/755,752
Amdt. dated: January 26, 2004
Reply to Office Action dated December 4, 2003

REMARKS

These remarks are set forth in response to the Office Action mailed December 4, 2003, (the "Office Action"). As this amendment has been timely filed within the three-month statutory period, neither an extension of time nor a fee is required. Presently, claims 1-24 are pending in the Patent Application. In the Office Action, however, claims 1-3, 6-11, 13-15 and 18-23 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,923,648 to Dutta ("Dutta"). Claims 5 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dutta and further in view of U.S. Patent No. 5,592,470 to Rudrapatna et al. ("Rudrapatna"). Claims 4 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dutta and further in view of U.S. Patent No. 5,666,364 to Pierce et al. ("Pierce"). Claims 12 and 24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rudrapatna et al. and further in view of U.S. Patent No. 6,404,769 to Kapoor ("Kapoor").

Review of Applicant's Invention

Prior to addressing the Examiner's rejections on art, a brief review of Applicant's invention is appropriate. Applicant's invention concerns a method and system for improving the capacity of cellular telephone networks that make use of repeaters. In particular, the system uses conventional air interface protocols for communications between a mobile subscribed unit and a repeater, but uses packetized communications protocol for the wireless backhaul link between the repeater and the base transceiver station (BTS). For example a packet data traffic channel (PTCH) is provided that

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includes an uplink and a downlink channel. The PTCH can be used concurrently with multiple active mobile subscribers. Different mobile subscriber units can have access to a single PTCH at specified times and for selectable periods of time for greater efficiency. The invention eliminates the need for a dedicated backhaul channel for each mobile unit and thereby reduces the number of carrier frequency channels required for backhaul communications. The unused RF carrier frequency channels are then free to be used for carrying additional mobile traffic capacity.

Rejection under 35 U.S.C. §102(e) based on Dutta

The Examiner has rejected claims 1-3, 6-11, 13-15 and 18-23 based on U.S. Patent No. 5,923,648 to Dutta ("Dutta"). However, Dutta does not concern cellular communication systems at all. Instead, Dutta discloses an orbiting satellite communications relay system. In order to emphasize this inherent distinction, the claims have been amended to specifically recite that the base station is a cellular base station. One skilled in the art seeking to improve the capacity of cellular telephone networks that make use of repeaters would not normally look to the field of satellite communications systems to solve such problems. Even so, a closer look at Dutta reveals that the system disclosed therein bears little relation to Applicant's disclosed system.

Dutta discloses a Land Earth Station (LES) and a corresponding satellite dish antenna 150 that communicates with mobile terminals 130 through an earth orbiting satellite 155. Dutta discloses a conventional time division multiplex access (TDMA) air interface. However, Dutta includes an added feature in that the return channels are not

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pre-designated as either signaling channels or message channels. Instead, Dutta provides the ability to selectively allocate a time period on a signal return path exclusively for message transmission by a particular one of the terminals. The time period has a length equal to at least one frame time period and includes a continuous sequence of message data from the selected terminal over the length of the period. Further, a second time period is established on the return channel exclusive of the time period established for message transmission. The second time period includes discretely spaced signaling slots and can be used by any of the terminals, but only for signaling transmissions. Thus, Dutta discloses a simple modified TDMA system in which selected time frames in a return channel are dedicated exclusively to message traffic for one mobile terminal, and other time periods on the return channel are usable by any of a plurality of such terminals for signaling transmission.

In conventional TDMA systems like the one described in Dutta, a channel is defined by a frequency and time slot. In contrast, it is well known in the art that packet data is routed through a network based on a destination address contained within each "packet". See Applicant's specification p. 3, lines 7-11. In Applicant's invention, packet channels are dynamically assigned for transmission of packetized information on a backhaul channel using techniques similar to those known in the art for implementing VoIP (Voice over IP). Packet channels are used so that a channel is occupied during the transmission of the packet only, and upon completion of the transmission the channel is made available for the transfer of other traffic.

Notwithstanding Dutta's reference to transmission of "signaling packets (of data)" (Col. 2, line 16-17) it is apparent from a reading of Dutta that such reference does not

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describe the use of packet channels or a packet switched network as those terms are understood in the art. In fact, Dutta directly teaches away from use of packets channels and packet switched networks as it explicitly teaches a TDMA based system instead.

Even if one could infer that Dutta's reference to "signaling packets (of data)" implied the existence of some type of packet channel or packet switched network for signaling, it is clear that Dutta does not disclose a packet network for subscriber traffic. In order to emphasize this distinction, Applicant has now amended claims 1 and 13 to explicitly recite the further limitation that the selected packets contain traffic data (as opposed to signaling data).

With regard to claims 11 and 23, Applicant notes that Dutta does not disclose or suggest a cellular communication system in which ground link transmissions between a repeater and a mobile subscriber are non-packet based, and transmissions between the repeater and the BTS are packet based as described above. As explained above, Dutta does not disclose the use of "packet" communications, as that term is used in Applicant's specification, but instead merely proposes a modified TDMA format. Accordingly, Dutta does not disclose the step of using a repeater for a conversion between packet and non-packet based communications to enhance backhaul link communications with a BTS in a cellular communication system.

The remaining claims are believed to be allowable over Dutta at least by virtue of their dependence on an allowable base claim.

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Rejection under 35 U.S.C. §103 based on Dutta in view of Rudrapatna

The Examiner has rejected claims 5 and 17 under 35 U.S.C. 103(a) as being unpatentable over Dutta and further in view of U.S. Patent No. 5,592,470 to Rudrapatna et al. ("Rudrapatna"). However, Rudrapatna merely discloses a wireless broadband communication architecture that can be structured to provide both narrowband and broadband services to an end user on demand. The system accomplishes this using spread spectrum techniques with dynamic allocation of frequency spectrum. As such, Rudrapatna does not make up for the deficiencies of Dutta. In particular Rudrapatna does not disclose or suggest Applicant's use of a packet switched network for implementation of a backhaul channel between a BTS and a repeater in a cellular communication system.

Rejection under 35 U.S.C. §103 based on Dutta in view of Pierce

Claims 4 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dutta and further in view of U.S. Patent No. 5,666,364 to Pierce et al. ("Pierce"). However, Pierce merely discloses a method for coordinating the receipt of incoming calls to a subscriber in a multi-network communication environment. Pierce does not make up for the deficiencies of Dutta. In particular Pierce does not disclose or suggest Applicant's use of a packet switched network for implementation of a backhaul channel between a BTS and a repeater in a cellular communication system.

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Rejection under 35 U.S.C. §103 based on Dutta in view of Rudrapatna and Kapoor

Claims 12 and 24 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rudrapatna et al. and further in view of U.S. Patent No. 6,404,769 to Kapoor ("Kapoor"). However, it appears that the Examiner intended to include Dutta in this combination. Kapoor does not concern cellular communication systems but instead discloses a satellite network that uses packetized data to route information among a plurality of earth orbiting satellites. Significantly, Kapoor does not contain any discussion regarding the problem of backhaul communications between a repeater and a BTS in a cellular communication system. At best, Kapoor merely discloses the use of packet communications between multiple earth orbiting satellites.

The Examiner suggests that the combination of Kapoor, Rudrapatna and Dutta could be used to render obvious Applicant's claimed invention. However, there is simply no disclosure contained in any of such references that would provide motivation for the combination as suggested by the Examiner. Moreover, there is nothing contained in the references themselves that would suggest such a combination for the purpose of solving the problem of reducing the number of RF carrier frequencies necessary for backhaul communications between a cellular BTS and a repeater communicating with the BTS in a cellular system.

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For the foregoing reasons, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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